# Engaging APNEP Communities on Climate Change

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APNEP State of the Sounds Symposium

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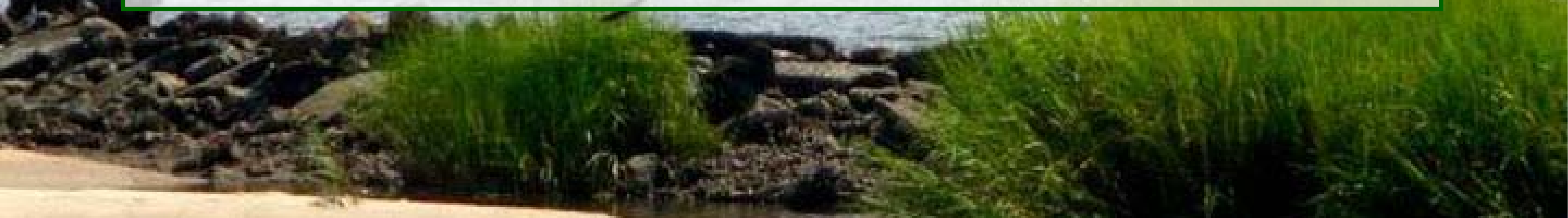


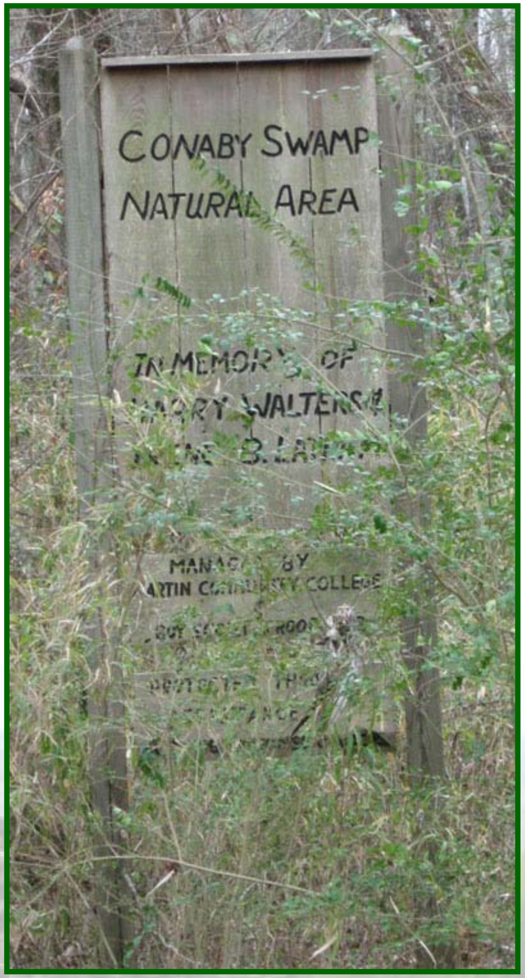
# Outline

- Why climate engagement is needed
- Town of Plymouth, NC
  - Interviews
  - Mapping and vulnerabilities
  - Participatory diagramming
- Lessons learned for APNEP communities

# Why engage communities?

- Climate change not broadly accepted as an immediate threat
- Climate science at time, spatial scales beyond local planning horizons
- “Low regrets” adaptation varies from place to place
- Local knowledge necessary to determine local impacts, acceptable responses

# Confidential Interviews with Plymouth leaders




- Local environmental knowledge
- Concerns about natural environment
- Challenges in responding to changes
- Sources of information

# What Plymouth residents told us

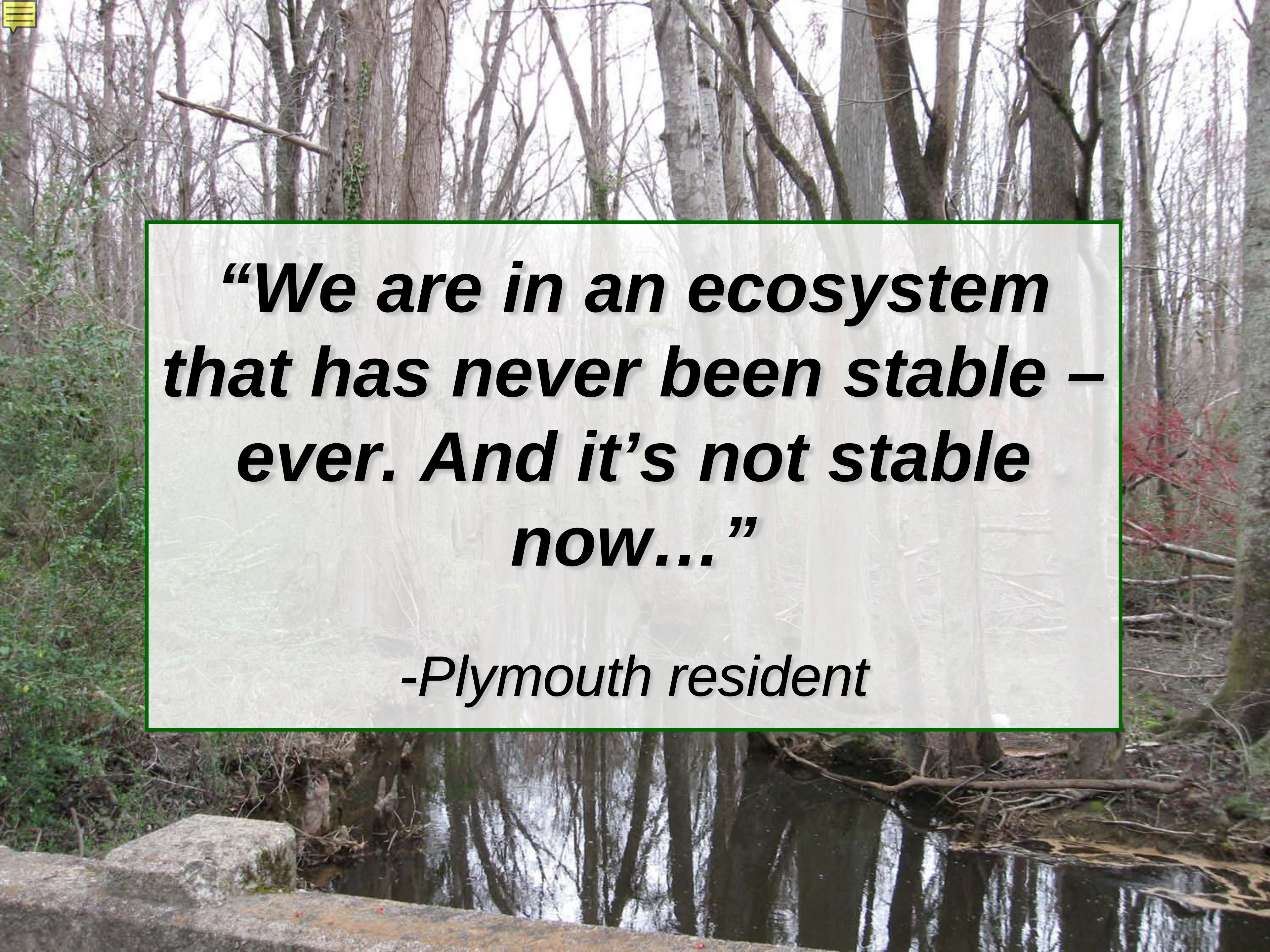
- Great sense of pride in Plymouth
- Roanoke River key part of community
  - Value of wildlife, natural beauty
  - Industrial history
  - Economic opportunity
- Environmental conditions improving
- Concerned about future

# What residents told us about flooding

- Causes: rainfall, river, hurricane storm surges, road construction
- Erosion: waterfront, wetlands, ditches
- Stormwater system OK if maintained - local creeks limited in capacity
- Waste water, septic system problems from rainfall, high water table
- Drought, sea level rise: salt water intrusion

# What Plymouth needs to respond

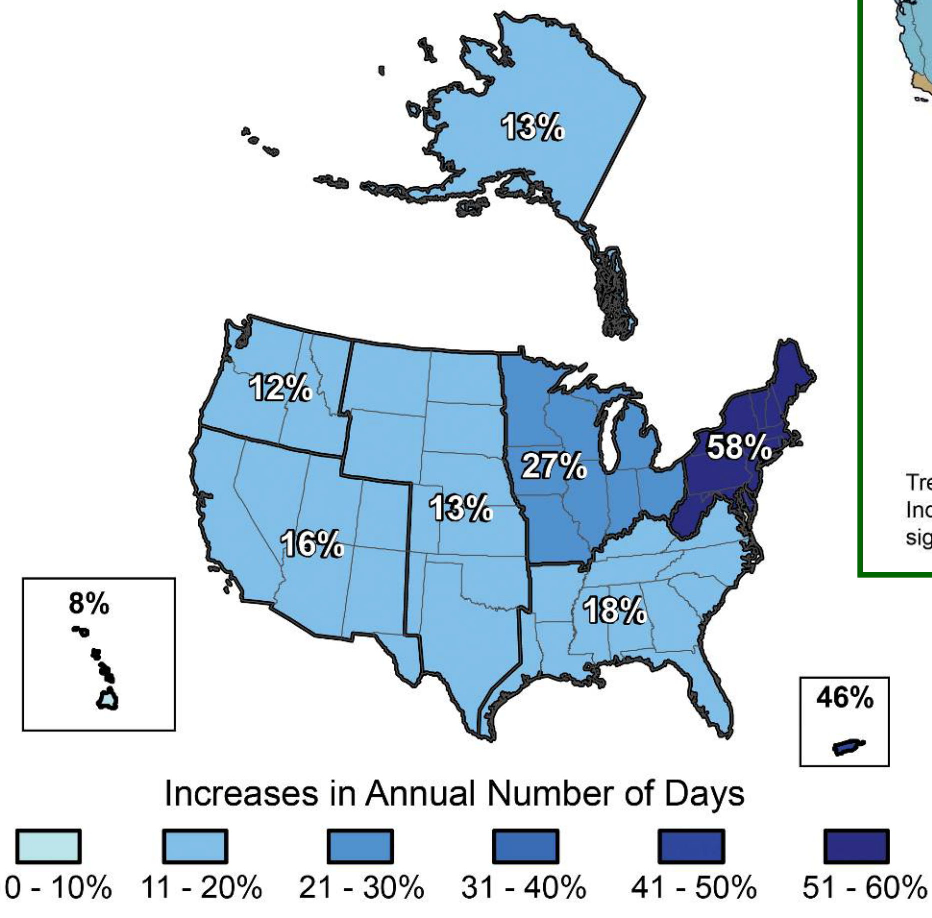
- More funding, better economic climate
- Higher community involvement
- Willingness to think of future when fixing current problems
- Greater awareness of environmental hazards, consequences
  - Regular town gatherings
  - Festivals, parades
  - Information to shift workers



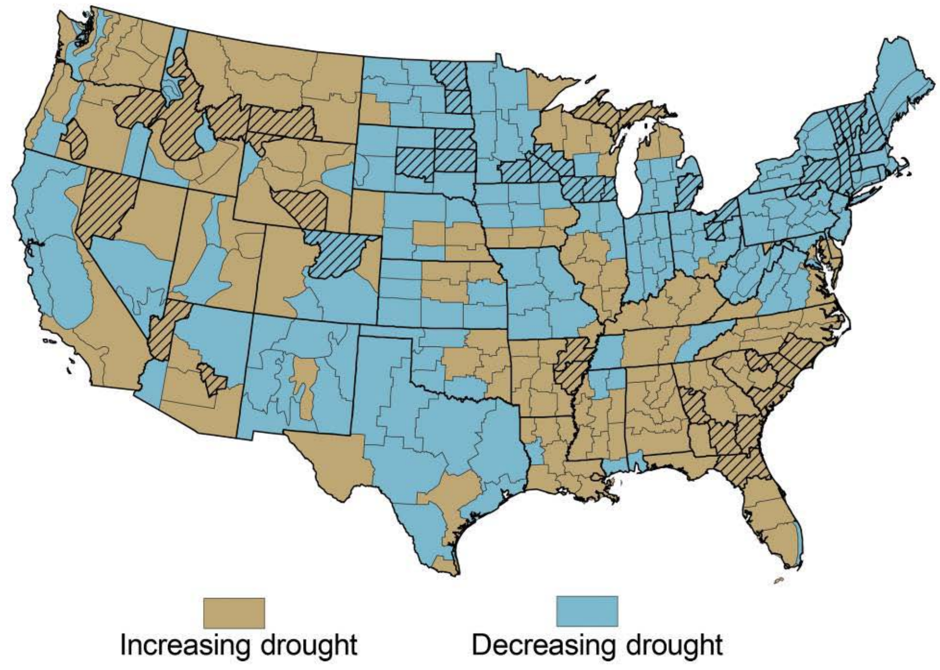
***"We are in an ecosystem that has never been stable – ever. And it's not stable now…"***

*-Plymouth resident*

*(US GCRP 2009)*




The map shows the percentage increases in the average number of days with very heavy precipitation (defined as the heaviest 1 percent of all events) from 1958 to 2007 for each region. There are clear trends toward more very heavy precipitation days for the nation as a whole, and particularly in the Northeast and Midwest.




Trends in end-of-summer drought as measured by the Palmer Drought Severity Index from 1958 to 2007 in each of 344 U.S. climate divisions.[144] Hatching indicates significant trends.

**For the Southeast, more wet and dry extremes in summer, especially since 1978:**

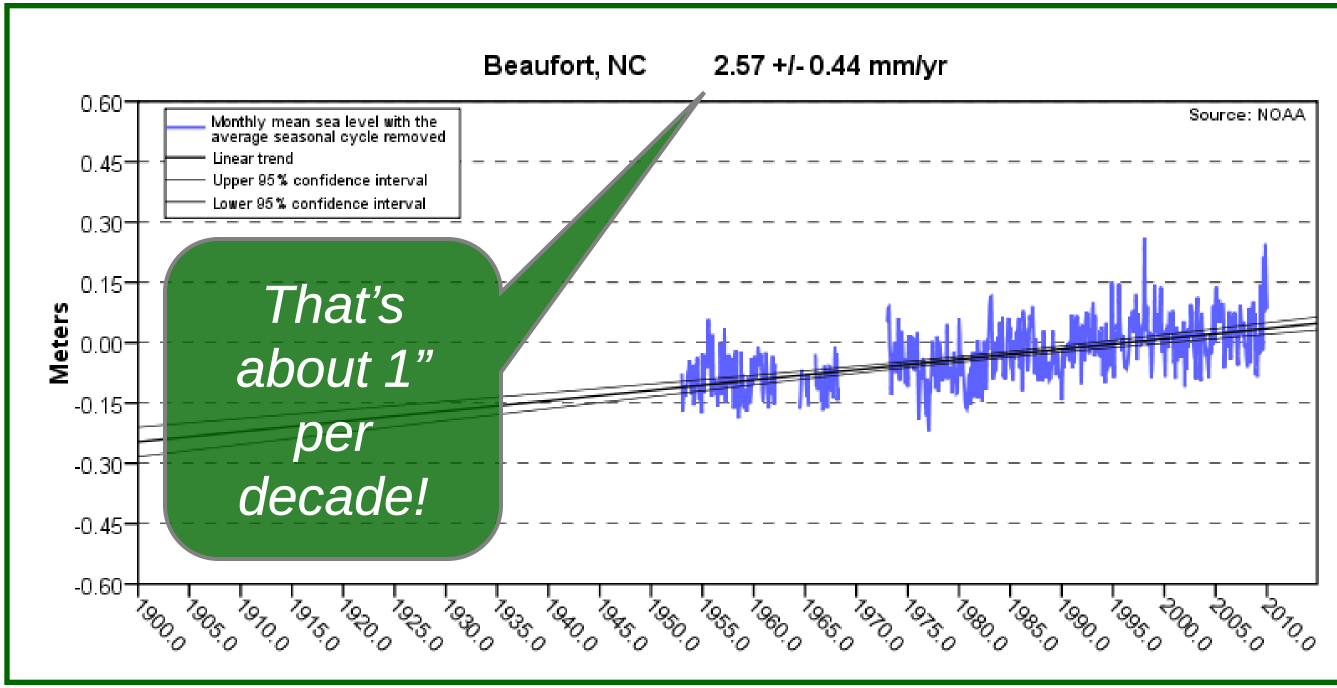
- More days with rainfall > 0.4” during very wet summers
- Fewer days with rainfall < 0.4” during very dry summers

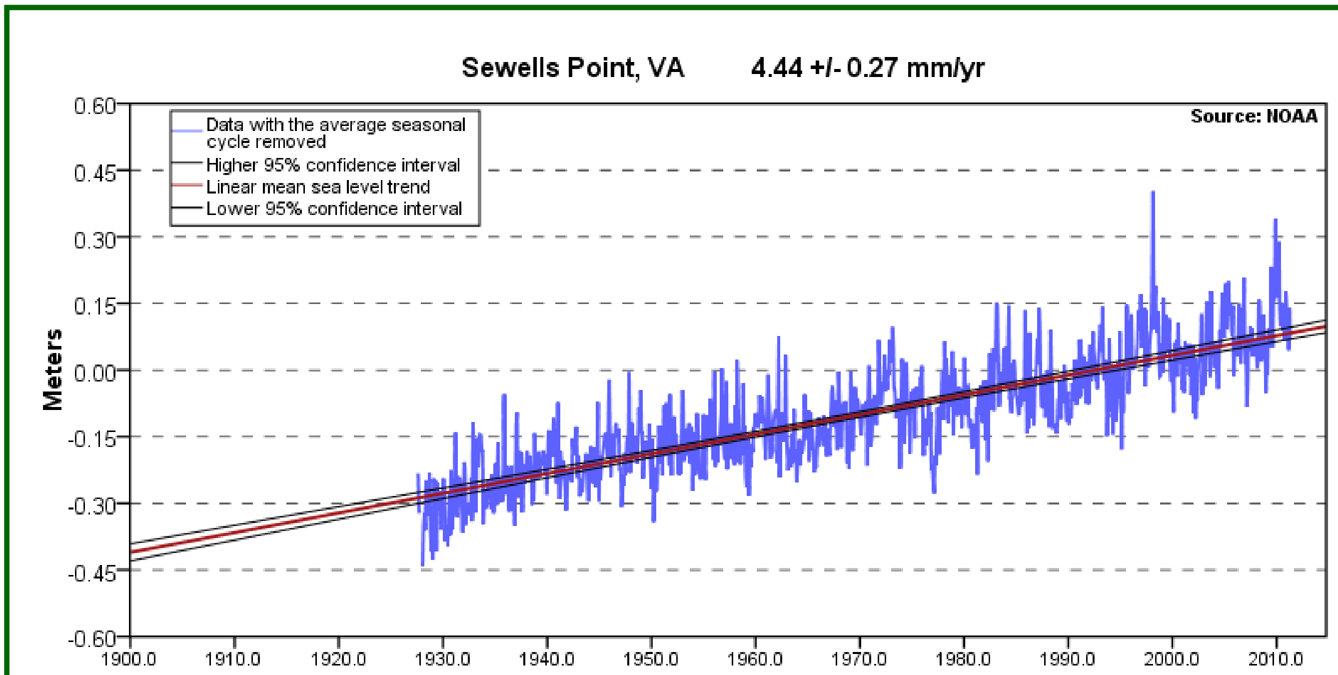
# Future precipitation scenarios

- Rainfall continues to be more variable
  - More frequent floods
  - More frequent droughts
- Hurricanes
  - Greater intensity; not more frequent

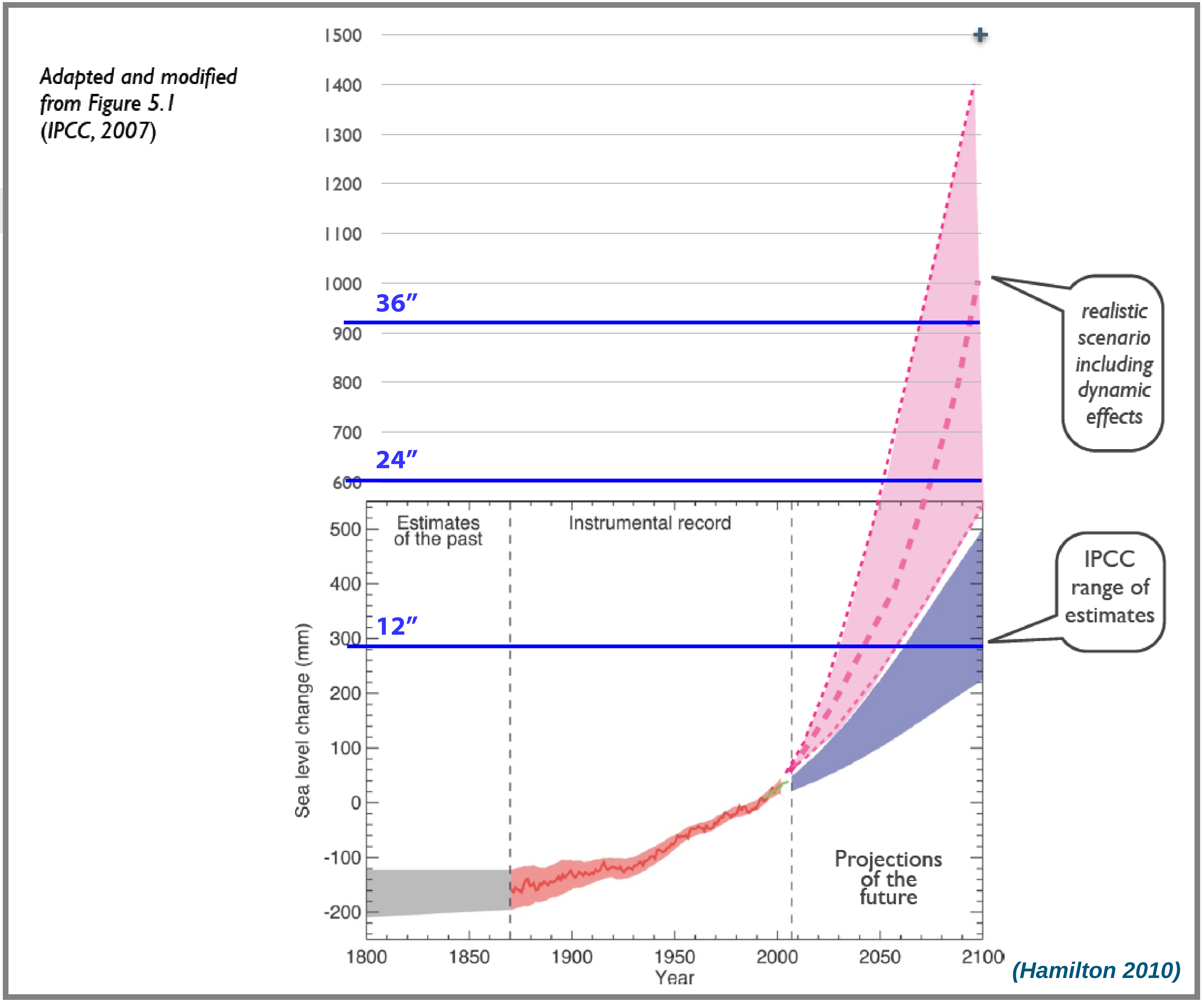
***"The sea level hasn't come up that much. It's only about a foot per century… (engineers) are not interested in that. If they build something that'll last 15-20 years they think they've done a miracle. They should take into account the probability of flooding."***

***- Plymouth resident***




(http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8656483%20Beaufort,%20NC; http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8638610%20Sewells%20Point,%20VA)


Adapted and modified
from Figure 5.1
(IPCC, 2007)
1500
1400
1300
1200
1100
1000
36”
900
800
700
24”
600
500
400
12”
300
200
100
0
-100
-200
Sea level change (mm)
Estimates
of the past
Instrumental record
Projections
of the
future
1800
1850
1900
1950
2000
2050
2100
Year
realistic
scenario
including
dynamic
effects
IPCC
range of
estimates
(Hamilton 2010)

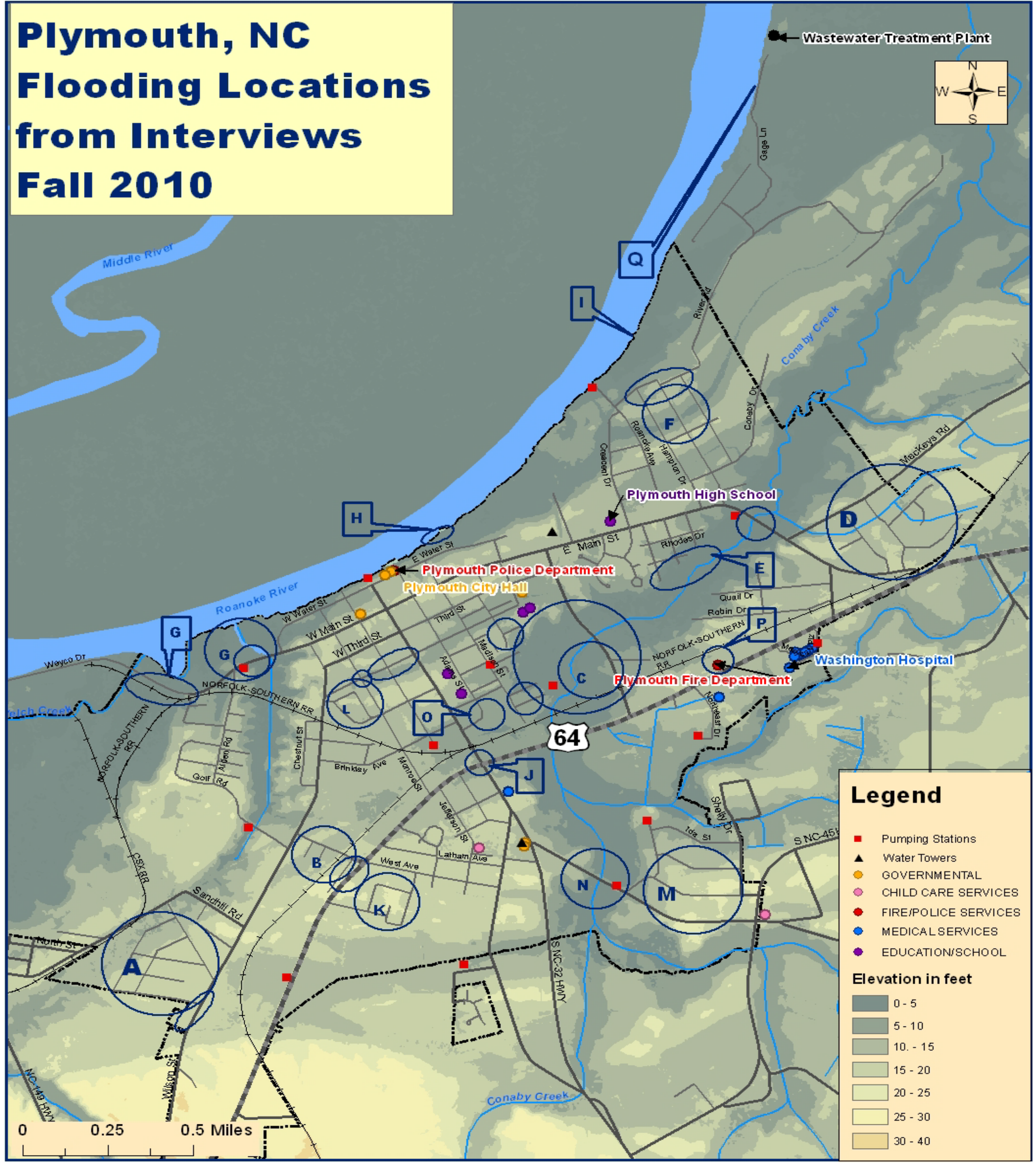
# SLR impacts BEFORE loss of land area

- Altered flooding patterns
  - Changing floodplains
  - Shallow coastal flooding at high tides
  - Higher storm surge
- Changing erosion patterns
- Wetlands moving inland
- More frequent salt water intrusion events

***"It runs off better now than it did before because of the town trying to keep the ditches and everything cleaned out…"***

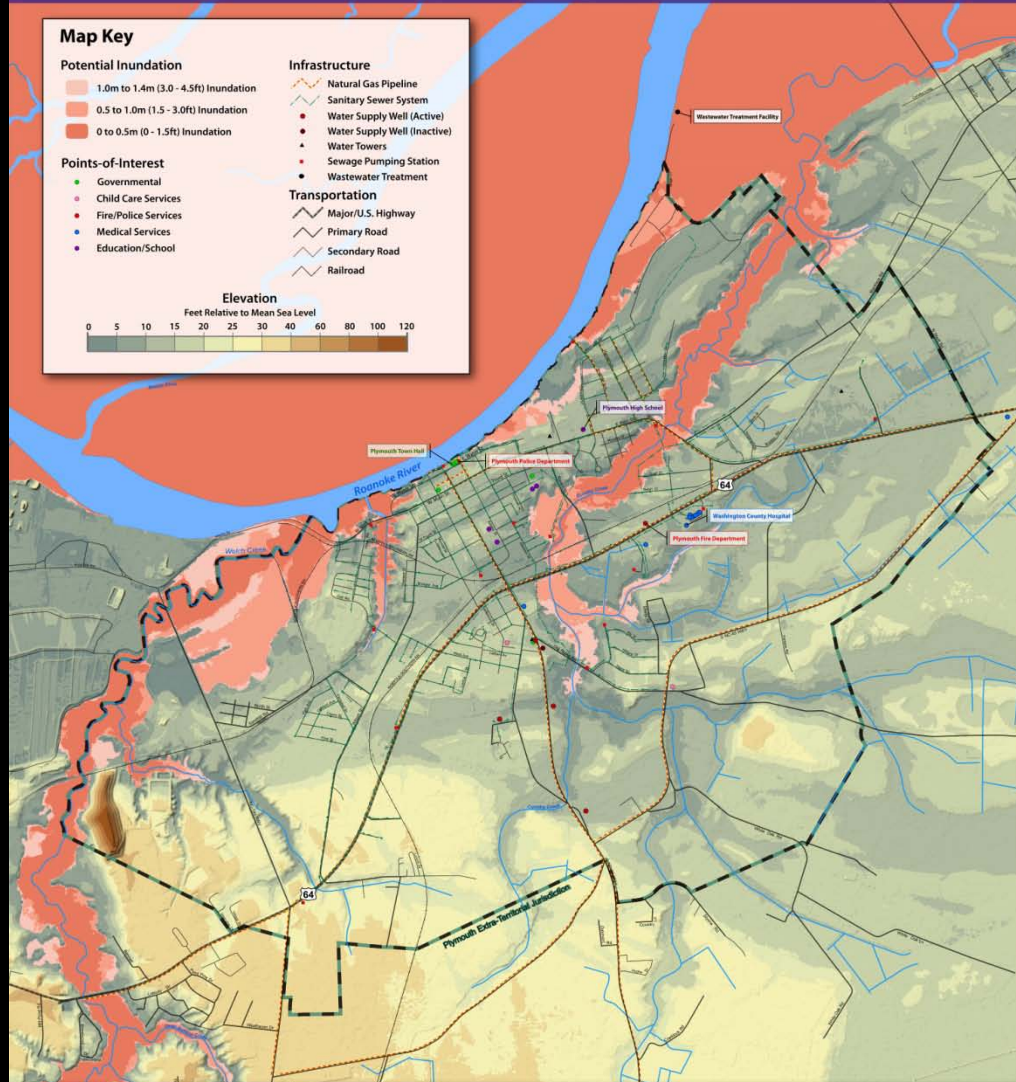
***- Plymouth resident***

***(RENCI @ ECU 2011)***



# *Potential Areas of Inundation*

## *Town of Plymouth, North Carolina*




This map was designed with a cartographic scale of 1:14,000 at a print size of 23.39" x 33.11".

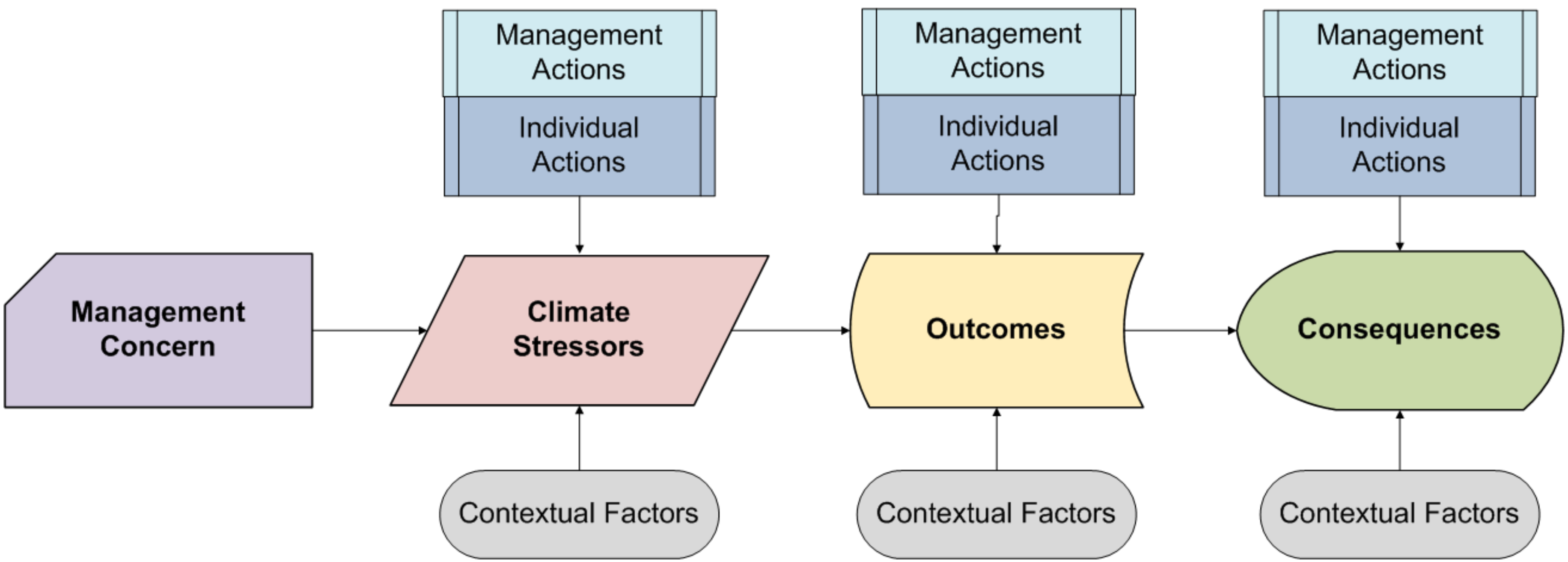
Inundation models were derived from 20-foot resolution floating point Digital Elevation Model (DEM) products obtained from the North Carolina Floodplain Mapping Project and further hydro-corrected by Renci@ECU. Accuracy of models is limited to available source data. A vertical exaggeration factor of 2.5x was applied to relief shading.

Base mapping data were provided by the Town of Plymouth and Washington County GIS. All other data were obtained from North Carolina Department of Transportation.

# *Vulnerability and Consequences Adaptation Planning Scenarios* (VCAPS) process

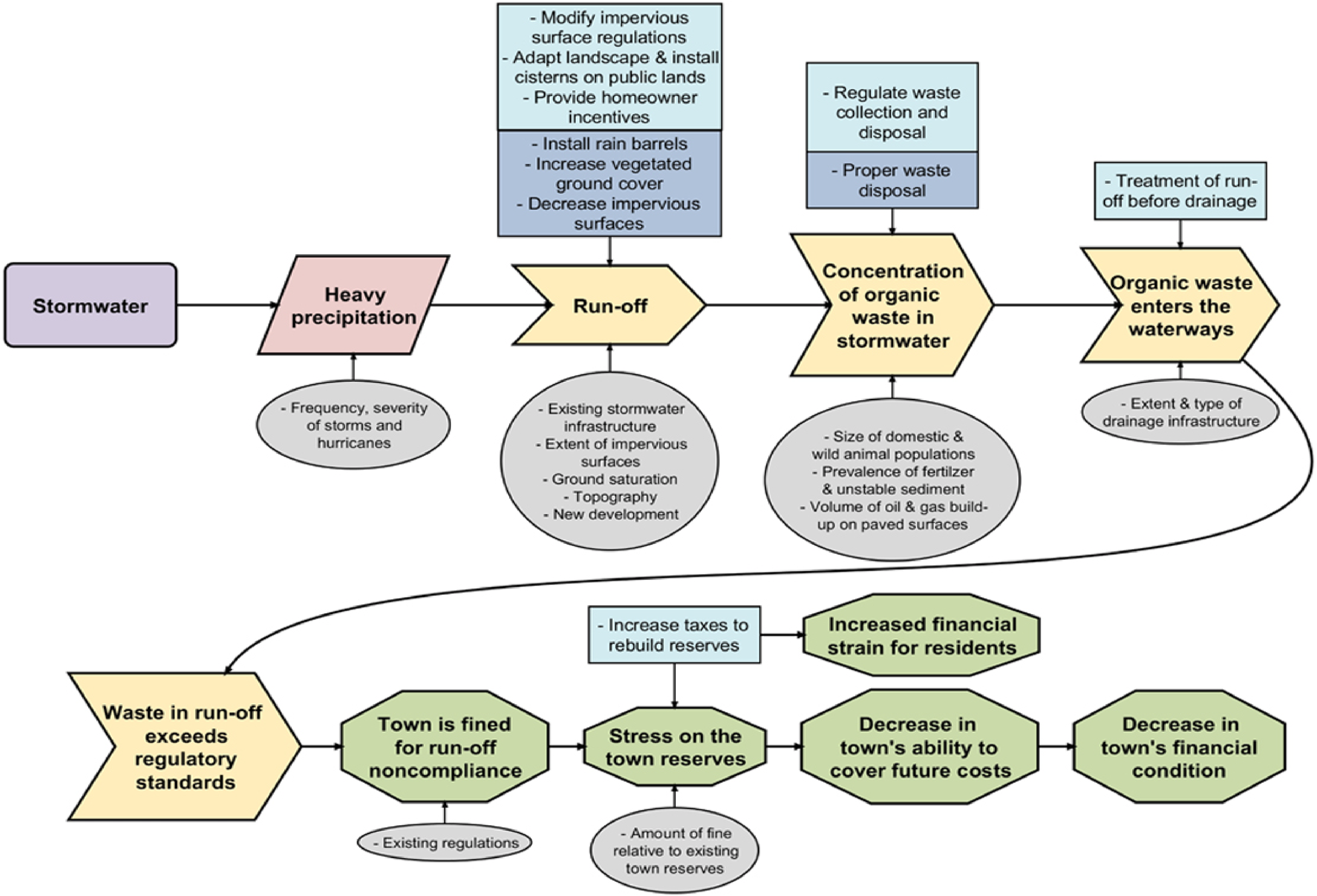
- Local decision-maker group evaluates environmental changes *in context of management issue already facing communities*
- Facilitated process tested in Sullivan's Island and McClellanville, SC (climate change & stormwater)
- Developed by Social and Environmental Institute (SERI), University of South Carolina, and South Carolina Sea Grant Consortium

# Making existing planning "climate smart" with VCAPS

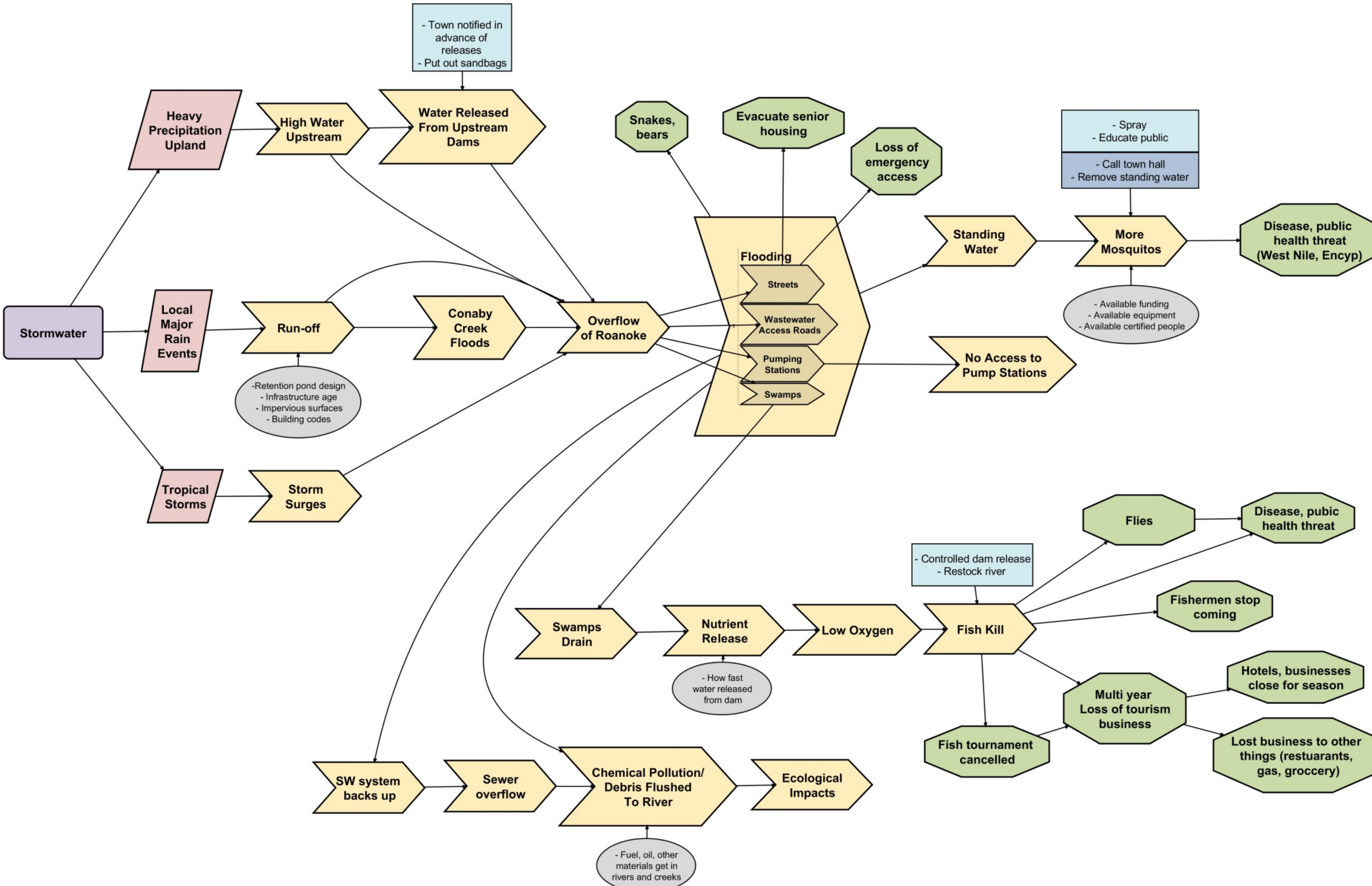


# Creating VCAPS diagrams

- Start simple; make the diagram more complex gradually.
- Begin with a **management concern** and a **climate stressor**.
- Start with the **outcome** that follows most immediately from the **climate stressor**.
- Focus on **outcomes** and **consequence**s that can be modified by **management actions** or **individual actions.**


Stormwater
Heavy precipitation
- Frequency, severity of storms and hurricanes
Run-off
- Modify impervious surface regulations
- Adapt landscape & install cisterns on public lands
- Provide homeowner incentives
- Install rain barrels
- Increase vegetated ground cover
- Decrease impervious surfaces
- Existing stormwater infrastructure
- Extent of impervious surfaces
- Ground saturation
- Topography
- New development
Concentration of organic waste in stormwater
- Regulate waste collection and disposal
- Proper waste disposal
- Size of domestic & wild animal populations
- Prevalence of fertilzer & unstable sediment
- Volume of oil & gas build-up on paved surfaces
Organic waste enters the waterways
- Treatment of run-off before drainage
- Extent & type of drainage infrastructure
Waste in run-off exceeds regulatory standards
Town is fined for run-off noncompliance
- Existing regulations
Stress on the town reserves
- Increase taxes to rebuild reserves
Increased financial strain for residents
- Amount of fine relative to existing town reserves
Decrease in town's ability to cover future costs
Decrease in town's financial condition

# Plymouth VCAPS: Day 1



# Lessons learned for APNEP communities

- Better understandings of local perceptions possible without "climate change" terminology
- Local level mapping must be tailored to local decisions
- Participatory diagramming helps solicit local input, build shared local understanding

# For more information, contact:

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